College Student Helping Behavior in Alcohol-Related Situations:

Assessing the Need for, Level of Implementation of, and Effectiveness of

Medical Amnesty

A Dissertation
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Abstract

Although a large proportion is under the minimum legal drinking age, college students consume alcohol at high rates and experience a range of alcohol-related consequences. In response to the perceived risk of death resulting from alcohol poisoning, colleges and states are increasingly implementing medical amnesty policies and laws. Research is needed to evaluate the need for, level of implementation of, and effectiveness of these policies. In this study, a mixed methods design was used to assess college student helping behavior in alcohol-related situations. To address Aim 1, data from multiple colleges were used to assess college students' decision to intervene in alcohol-related situations. Among students who reported being in at least one situation in the past year when someone was drinking too much, more than one-half did not intervene at least once. The most common reasons for not intervening were: "I felt it was none of my business" and "I didn't know what to do". "I was afraid I'd get in trouble" was the least common reason for not intervening. To address Aim 2, key informant interviews were used to describe how Minnesota colleges implemented the state medical amnesty law. Some colleges had done some implementation of the law, but other colleges have done very little. All colleges could do more. To address Aim 3, data from multiple years of cross-sectional surveys administered to students at 17 colleges were used to assess student behavior before and after enactment of a medical amnesty law. The prevalence of being very likely to call 911 in an alcohol- or

drug-related situation significantly increased between 2007 and 2015 but in the context of this secular trend, enactment of a state medical amnesty law was associated with lower prevalence of being very likely to call 911 in an alcohol- or drug-related situation. Few existing studies have evaluated medical amnesty policies and laws. This dissertation provides important insight into whether medical amnesty policies and laws should be a recommended strategy for reducing the negative consequences of college student alcohol use.

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Background and Significance

College Student Alcohol Use is a Public Health Problem

Although a large proportion is under the minimum legal drinking age, college students consume alcohol at high rates. Among full-time college students, 81.4% have consumed alcohol in their lifetime, 79.0% have consumed alcohol in the past year, and 63.2% have consumed alcohol in the past 30 days (Johnson et al, 2016). Further, when college students drink, they tend to consume an alarming quantity of alcohol. Among full-time college students in 2015, 31.9% engaged in binge drinking (consuming five or more drinks in a row in the past two weeks), 13% consumed 10 or more drinks in a row at least once in the prior two weeks, and 5% consumed 15 or more drinks in a row at least once in the prior two weeks (Johnston et al, 2016).

Alcohol consumption by adolescents and young adults leads to a wide range of short- and long-term consequences that affect the individual drinker, the people around them, and society as a whole (USDHHS, 2007). Alcohol plays a significant role in risky sexual behavior, physical and sexual assaults, various types of injuries and medical problems, death by alcohol poisoning, and suicide (USDHHS, 2007). About 5000 individuals under age 21 die from alcohol-related injuries involving alcohol use each year (USDHHS, 2007).

On college campuses, the negative consequences of alcohol use are particularly serious and pervasive (USDHSS, 2007). Each year, an estimated 1800 college students die from alcohol-related unintentional injuries, about

600,000 students are unintentionally injured while under the influence of alcohol, about 700,000 students are assaulted by other students who have been drinking, and about 100,000 students are victims of alcohol-related sexual assault or date rape (Hingson et al. 2009). Alcohol poisoning deaths among college students per year are not systematically tracked but the CDC estimates about 110 alcohol poisoning deaths among 15- to 24-year-olds in the United States per year (2015). Additionally, among young adults ages 18-24, more than 58,000 were hospitalized for alcohol overdose and more than 1,100 were hospitalized for alcohol poisoning in 2008 (White et al, 2011). About one in four college students report having academic consequences because of their drinking, including missing class, falling behind, doing poorly on exams or papers, and receiving lower grades overall (NIAAA, 2002). While binge drinking appears to be declining among young adults, despite a variety of prevention efforts directed towards college students, the rate among college students appears to be declining more slowly than among both 12th graders and college-aged young adults not attending college (Johnson et al, 2014).

College Campus Environment Influences College Student Alcohol Use

According to the National Institute on Alcohol Abuse and Alcoholism (NIAAA), although the majority of students come to college already having some experience with alcohol use, the college environment can intensify the problem (2002). For example, college students encounter unstructured time, widespread alcohol availability, inconsistent underage drinking law enforcement, and limited

interactions with their parents and other adults (NIAAA, 2002). In fact, drinking at college has become a ritual that students often see as an integral part of their college experience (NIAAA, 2002).

Many possible explanations for the college drinking culture have been proposed. Campuses might provide insulation from changes in drinking laws, societal trends, and intervention attempts (Johnston et al, 2012). On college campuses, individuals under the legal drinking age live with peers of legal age who can easily supply them with alcohol. Additionally, much alcohol advertising and promotion is directed specifically at the college student population (Johnston et al, 2012). In recognition of the college environment's influence on student alcohol use, the U.S. Surgeon General and the NIAAA call upon colleges to examine their policies and practices and determine the extent to which they may directly or indirectly encourage, support, or facilitate underage and risky alcohol use (NIAAA, 2002; USDHHS, 2007).

Most colleges have some policies and practices in place aimed to reduce alcohol use and associated negative consequences, although some policies are more prevalent than others. According to a survey of 351 four-year U.S. colleges, many colleges prohibit alcohol use for students under age 21 (62%), prohibit alcohol use at sporting events (69%), prohibit alcohol use at dorm parties and events (70%), prohibit kegs at campus events (70%), and require checking age identification of attendees at campus events (62%) (Lenk et al, 2012). However, only a minority of colleges prohibits alcohol use at sorority parties (30%) and at

fraternity parties (25%) (Lenk et al, 2012). Many colleges need to consider putting into place more alcohol policies and practices on their campuses, particularly policies with the strongest basis for effectiveness (e.g., policies recommended by NIAAA as effective) (Lenk et al, 2012). The U.S. Surgeon General suggests that colleges can support the national goal of preventing and reducing underage drinking by establishing and enforcing clear policies that prohibit alcohol use by underage students on their campuses and sponsoring only interventions that research has confirmed are effective in preventing and reducing underage and risky alcohol use (USDHHS, 2007).

A Variety of Strategies Have Been Suggested for Reducing College Student Alcohol Use and Associated Harms

The NIAAA recently rated the relative effectiveness of 60 individual-level and environmental-level strategies and developed the College Alcohol Intervention Matrix (CollegeAIM) to help colleges and universities identify the strategies most likely to reduce underage and harmful drinking and associated negative consequences (NIAAA, 2015). The 36 environmental-level strategies rated by CollegeAIM are listed by effectiveness and cost in Table 1.

Table 1. CollegeAIM environmental-level strategies.

Lower Costs	Mid-Range Costs	Higher Costs
Higher Effectiveness		
▪ Restrict happy hours/price promotions ▪ Retain ban on Sunday sales (where applicable) ▪ Retain age-21 drinking age	▪ Enforce age-21 drinking age (e.g., compliance checks) ▪ Increase alcohol tax	
Moderate Effectiveness		
▪ Retain or enact restrictions on hours of alcohol sales ▪ Enact social host provision laws	▪ Prohibit alcohol use/sales at campus sporting events ▪ Enact dram shop liability laws: Sales to intoxicated ▪ Enact dram shop liability laws: Sales to underage ▪ Limit number/density of alcohol establishments ▪ Retain state-run alcohol retail stores (where applicable)	▪ Enact responsible beverage service training laws
Lower Effectiveness		
	▪ Establish an alcohol-free campus ▪ Conduct campus-wide social norms campaign	▪ Restrict alcohol sponsorship and advertising ▪ Implement beverage service training programs: Sales to intoxicated ▪ Implement beverage service training programs: Sales to underage ▪ Enact keg registration laws
Too few robust studies to rate effectiveness–or mixed results		
▪ Prohibit alcohol use/service at campus social events ▪ Establish amnesty policies ▪ Require Friday morning classes ▪ Establish standards for alcohol service at campus social events ▪ Establish substance-free residence halls Prohibit beer kegs ▪ Establish minimum age requirements to serve/sell alcohol ▪ Implement party patrols ▪ Increase cost of alcohol license ▪ Prohibit home delivery of alcohol ▪ Enact noisy assembly laws	▪ Implement bystander interventions	▪ Require alcohol-free programming ▪ Implement safe-rides program ▪ Conduct shoulder tap campaigns ▪ Enact social host property laws ▪ Require unique design for state ID cards for age<21

Note: Table adapted from NIAAA (2015).

Additionally, five broader strategies have been suggested to reduce college drinking behavior and the problems associated with college student alcohol use:

1) Implement a screening and intervention system on campus to identify and help students who experience problems related to their drinking.
2) Improve campus policies and procedures for addressing student alcohol issues.
3) Limit the availability of alcohol by reducing marketing, reducing outlet density, and improving responsible beverage service standards.
4) Enforce existing policies on underage drinking, service to intoxicated patrons, and alcohol-impaired driving.
5) Increase the price of alcohol through taxes and eliminating price discounting (Nelson & Winters, 2012).

The first two strategies focus on the college campus while the other three strategies address binge drinking as a public health issue and focus on the larger environment and the conditions that shape the availability of alcohol in the campus community (Nelson & Winters, 2012). These strategies recognize that drinking behavior influences the negative consequences of alcohol use and aim to reduce alcohol-related problems by reducing drinking levels (Nelson & Winters, 2012; Wechsler & Nelson, 2006).

Because many young adults have already engaged in alcohol use by the time they enter college, some researchers suggest that primary prevention may

not be effective at reducing alcohol use or the negative consequences of alcohol use among college students (Marlatt & Witkiewitz, 2002). They propose that prevention strategies that aim to reduce the amount of harm experienced by young adults who drink may be a more realistic and more effective method for educating individuals about the possible consequences associated with alcohol consumption and preventing these negative consequences from happening (Larimer et al, 1998, Marlatt & Witkiewitz, 2002).

According to Marlatt and Witkiewitz (2002), harm reduction offers a pragmatic approach to alcohol consumption and alcohol-related problems based on three core objectives: 1) to reduce harmful consequences associated with alcohol use; 2) to provide an alternative to zero-tolerance approaches by incorporating drinking goals (abstinence or moderation) that are compatible with the needs of the individual; and 3) to promote access to services by offering low-threshold alternatives to traditional alcohol prevention and treatment.

Proponents of harm reduction approaches suggest that the strategy offers a pragmatic and compassionate approach to the prevention and treatment of problem drinking that shifts the focus away from alcohol use itself to the consequences of harmful drinking behavior (Marlatt & Witkiewitz, 2002). Opponents of harm reduction suggest that by failing to address students' drinking behavior, the strategy enables them to continue to engage in risky behavior without consequence (Oster-Aaland & Eighmy, 2007).

Medical Amnesty Policies and Laws are Increasingly Being Implemented

In response to the perceived risk of death resulting from alcohol poisoning, colleges are increasingly implementing medical amnesty policies, a harm reduction strategy (Oster-Aaland et al, 2009). Additionally, 35 states and Washington, D.C. have passed medical amnesty legislation (The Medical Amnesty Initiative, 2016). Medical amnesty policies do not aim to reduce alcohol use. Rather, they aim to reduce harm when individuals are consuming alcohol. When underage drinkers witness or experience a negative consequence associated with alcohol use, they may hesitate to call for help because they are afraid of getting in trouble for engaging in an illegal behavior (Lewis & Marchell, 2006). Medical amnesty policies aim to encourage college students to seek help in situations where an individual needs medical assistance by providing amnesty for college or state alcohol policy or law violations if a student does call for help (Oster-Aaland et al, 2009). While the specific wording and requirements of state medical amnesty laws differ slightly, the purpose of these state laws is to grant limited immunity for law violation (e.g., underage possession or consumption of alcohol) in specific situations where they contact officials during a medical emergency (The Medical Amnesty Initiative, 2016). College medical amnesty policies, on the other hand, provide limited immunity from college sanctions but the immunity does not apply to legal consequences (Oster-Aaland & Eighmy, 2007). Most college and state medical amnesty policies and laws provide protection for both the student experiencing symptoms of alcohol poisoning and

the student who called for help, and some college medical amnesty policies provide protection for student organizations (Oster-Aaland & Eighmy, 2007).

Medical amnesty policies are based on several assumptions:

1) Students can correctly identify the warning symptoms of alcohol poisoning.
2) Students can understand the risk associated with the symptoms of alcohol poisoning.
3) Students responsible for help seeking are sober enough to judge the level of risk involved.
4) Students are currently not calling for help due to fear of getting in trouble, either for themselves or their peers.
5) Students will be more likely to call for help if they are assured they will not get in trouble (Oster-Aaland et al, 2009).

However, these assumptions have not been directly tested, and research on the effectiveness of medical amnesty policies on student behavior is limited. CollegeAIM does not identify establishing medical amnesty policies or laws as an effective environmental-level strategy to reduce underage and excessive drinking and associated consequences because of too few robust studies to rate effectiveness or mixed results.

Cornell University implemented a Medical Amnesty Protocol (MAP) designed to increase the likelihood that students would call for help in alcohol-related medical emergencies (Lewis & Marchell, 2006). The number of calls for

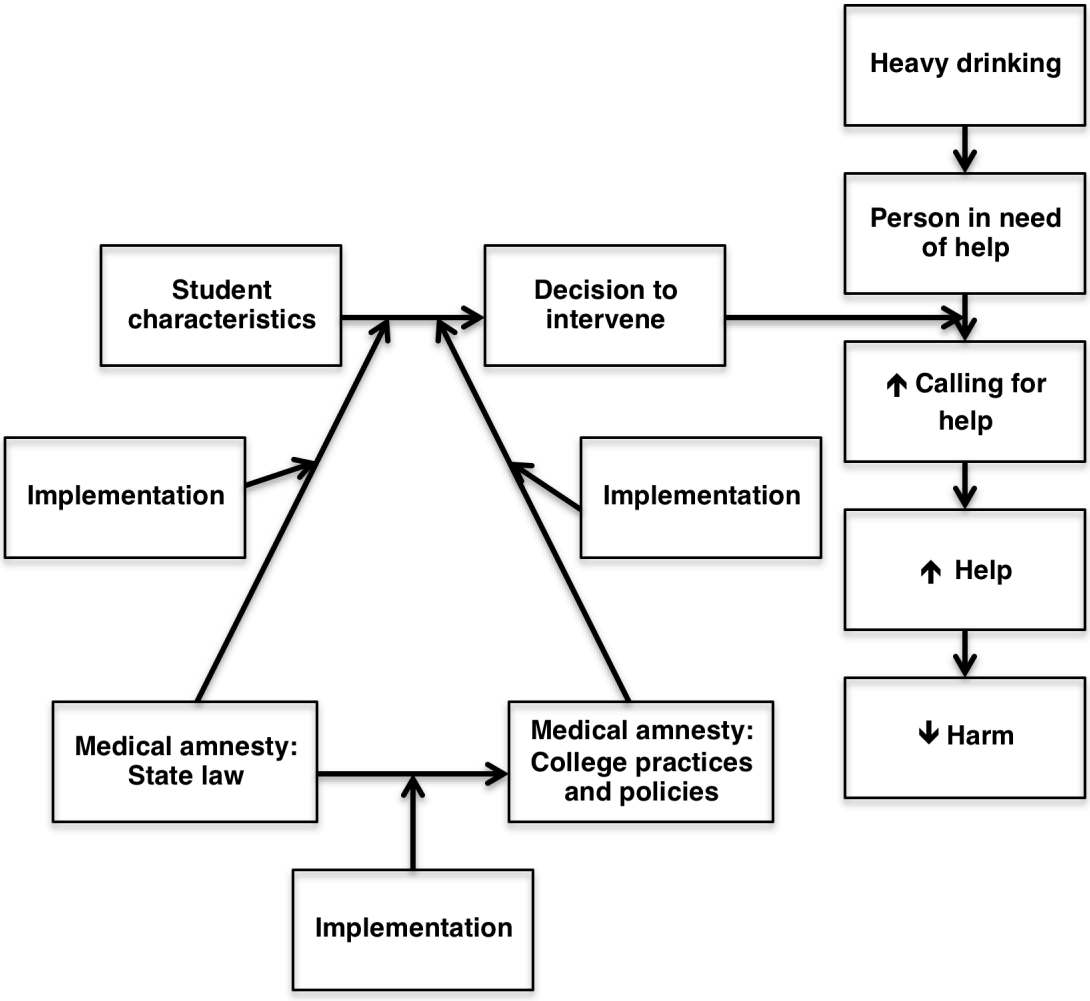
assistance to emergency medical services increased in the two years following the policy implementation. Additionally, following the initiation of the MAP, a slight but not statistically significant increase occurred in the percentage of students who self-reported calling for help on behalf of an intoxicated person. However, these increases could suggest that students were more likely to call for help because of the MAP or that heavy drinking among students increased leading to a larger percentage of students needing emergency assistance. Students were less likely to report they did not call for help in an alcohol-related medical emergency because they "didn't want to get the person in trouble" following initiation of the MAP. Cornell's experience provides limited evidence in support of a medical amnesty policy but additional research is warranted to evaluate the effectiveness of medical amnesty policies on student behavior.

Conceptual Model

Figure 1 presents a conceptual model developed for this project that describes how medical amnesty policies and laws might influence college student helping behavior in alcohol-related situations. Heavy alcohol consumption can lead to alcohol poisoning and a student needing help or medical assistance. If a student needs help due to alcohol poisoning, other students calling for help will increase the likelihood of them receiving help, which will decrease the harm the student experiences. For a student to call for help in an alcohol poisoning situation, they must decide to intervene in the situation. Individual characteristics might influence the decision to intervene. As intention to intervene into others'

drinking increases, actual intervention into others' drinking increases (Thomas & Seibold, 1995). Based on the assumption that students will be more likely to call for help if they are assured they will not get in trouble, medical amnesty policies aim to encourage college students to seek help when they see symptoms of alcohol poisoning by providing amnesty for university alcohol policy violations if a student calls for help in an alcohol-related medical emergency (Oster-Aaland et al, 2009). Simply enacting a policy is likely not sufficient to effectively change behavior. Rather, policies have to be fully and effectively implemented (e.g., promoted, enforced) to achieve their intended goals (Jones-Webb et al, 2014). While a medical amnesty law may be enacted at the state level, implementation of this law at the college level may be necessary to encourage students to seek help in alcohol-related situations.

Figure 1. Conceptual model describing how medical amnesty policies and laws might influence college student helping behavior in alcohol-related situations



Fully testing each of the paths in the conceptual model is beyond the scope of this dissertation. However, using the conceptual model in Figure 1 as a guide and focusing on decision to intervene, student characteristics, a state medical amnesty law, and policy implementation, this study will investigate: 1) college students' decision to intervene in alcohol-related situations; 2) implementation of a state medical amnesty law at several colleges; and 3) college student helping behavior before and after enactment of a medical amnesty law.

Specific Aims

In this study, a mixed methods design will be used to assess college student helping behavior in alcohol-related situations by addressing three specific aims:

Aim 1. Assess college students' decision to intervene in alcohol-related situations.

Using data from multiple colleges, college students' decision to intervene in alcohol-related situations will be assessed by addressing three research questions:

1) In situations when someone was drinking too much, are demographic characteristics and binge drinking associated with college students' decisions to intervene or not intervene?
2) In situations where someone was drinking too much and college students did not intervene, what was the reason they did not intervene?
3) Are demographic characteristics and binge drinking associated with college students' reasons for not intervening when someone was drinking too much?

Aim 2. Describe how colleges in Minnesota implemented the state medical amnesty law.

Using interviews with three types of key informants (e.g., alcohol prevention specialists, Dean of Students office staff, and police or security staff)

at 15 Minnesota colleges, how Minnesota colleges implemented the state medical amnesty law will be described by addressing four research questions:

1) How and to what extent did colleges educate stakeholders and build public awareness about the medical amnesty law?
2) How and to what extent did colleges monitor and enforce compliance with the medical amnesty law?
3) How and to what extent did colleges evaluate the medical amnesty law?
4) How and to what extent did colleges institutionalize the medical amnesty law?

Aim 3. Assess college student helping behavior before and after enactment of a medical amnesty law.

Using data from multiple years of cross-sectional surveys, student helping behavior in a drug- or alcohol-related situation before and after enactment of Minnesota's medical amnesty law will be assessed by addressing three research questions:

1) Are college students more likely to call 911 in a drug- or alcohol-related situation after enactment of a state medical amnesty law?
2) Are school characteristics and individual characteristics associated with college students' likelihood of calling 911?
3) Are underage college students more likely to engage in high-risk drinking after enactment of a state medical amnesty law?

Manuscript 1: Decision to Intervene in Alcohol-Related Situations

Significance

For a student to call for help in an alcohol poisoning situation, they must decide to intervene in the situation. The majority of college students experience situations where they have to decide if they are going to intervene in some way with a drinker (Thomas & Seibold, 1995). Situational and individual characteristics influence students' decisions to engage in helping behavior, and as intention to intervene into others' drinking increases, actual intervention into others' drinking increases (Boekeloo & Griffin, 2009, Thomas & Seibold, 1995).

Only a few studies have assessed students intervening in alcohol-related situations. In a study of undergraduate students attending three different U.S. colleges prior to the relatively recent enactment of medical amnesty policies and laws, 73% of students indicated that they had intervened in a drunk-driving situation and 23% of students indicated that they had intervened in an alcohol abuse situation (Thomas & Seibold, 1995). These students reported that they had attempted to intervene in alcohol-related situations an average of three times during the past year with at least two different individuals (Thomas & Seibold, 1995). Both male and female students cited friendship with the target as the primary reason for intervening into the alcohol abuse situation (62% and 58%, respectively) (Thomas & Seibold, 1995). Few (25%) students reported knowing someone with an alcohol abuse problem and choosing not to say or do anything. Despite recognizing a need to intervene, specific situational characteristics inhibit

students' decision to intervene, including not knowing the other student well enough, feeling powerless, being intoxicated themselves, and wanting to avoid conflict (Thomas & Seibold, 1995).

A more recent study conducted at one large, mid-Atlantic campus found that within the first two months of college, about three out of four (75.2%) first-year students living in freshmen dormitories intervene with a drinker (Boekeloo & Griffin, 2009). More than half of students reported engaging in helping behavior such as giving a student who had drunk too much alcohol some water (60.1%), helping a drinker get home (57.3%), and staying with someone to take care of that person after drinking (52.9%) (Boekeloo & Griffin, 2009). Students reported engaging in more intrusive behaviors like taking a drink away from someone (42.9%) and making someone leave a bar/party (33.4%) less frequently. Few students reported that they called 911 or got emergency medical assistance (<10%) or got Department of Resident Life staff assistance (<10%) (Boekeloo & Griffin, 2009). It is not clear from this study how many students were in situations where calling 911 or getting emergency medical assistance or Department of Resident Life staff assistance would have been appropriate interventions. Overall, the study findings suggest that as student affiliation with the drinker increases, intention to intervene increases. As intention to intervene into others' drinking increases, actual intervention into others' drinking increases (Boekeloo & Griffin, 2009).

More studies have assessed students' intervention in other situations,

including sexual assault, depression, and suicide attempts. Based on the bystander intervention situational model developed by Latane and Darley (1970), Burn identified five barriers to bystander intervention in sexual assault situations: failure to notice the event, failure to identify the situation as high risk, failure to take intervention responsibility, failure to intervene due to skills deficit, and failure to intervene due to audience inhibition (2009). Results from a study of 588 undergraduate students at a California public university suggest that failure to notice a high-risk situation and failure to identify the situation as high risk are the biggest barriers to bystander intervention in a sexual assault situation (Burn, 2009). A study of 242 first-year college students in one New England university that further explored the bystander intervention situational model found a felt sense of responsibility and feeling that the situation is intervention-appropriate as the primary facilitators to intervening in a sexual violence situation and inadequate skills to intervene and a lack of felt responsibility as the primary barriers to intervening in a sexual violence situation (Bennett et al, 2014).

When asked about their self-efficacy in identifying friends at risk for suicide and helping suicidal friends find campus resources, few students at three Midwestern universities strongly believed that they could recognize a friend at risk for suicide (11%) or strongly believed that they could ask a friend if he or she was suicidal (17%). Slightly more students strongly believed that they could help a friend at risk to see a counselor or mental health professional (20%), effectively offer support (24%), or talk with others to determine if the friend was at risk (23%)

(King et al, 2008). According to a study of 328 students at a large Midwestern university, self-efficacy (i.e., whether the individual is able to perform and adhere to the recommended course of action), response efficacy (i.e., effectiveness of the response), perceived severity (i.e., perception of the threat's seriousness), perceived knowledge (but not actual knowledge), perspective-taking (i.e., ability of an individual to take someone else's cognitive point of view), empathetic concern (i.e., degree to which an individual's feelings of sympathy and concern are focused on unfortunate others), and emotional contagion (i.e., vicariously experiencing an observed emotional response) are predictors of behavioral intentions to intervene with a depressed friend (Egbert et al, 2014).

In situations where some form of help is potentially needed, a variety of factors can serve as facilitators or barriers to college students' decision to intervene. It is important to identify those facilitators and barriers. The majority of college students report experiencing alcohol-related situations where another student needs help (Thomas & Seibold, 1995; Boekeloo & Griffin, 2009). Students need to decide if they are going to intervene if they see a student experiencing symptoms of alcohol poisoning.

The objective of the proposed study is to assess college students' decision to intervene in alcohol-related situations by addressing three research questions:

1) In situations when someone was drinking too much, are demographic characteristics and binge drinking associated with college students' decisions to intervene or not intervene?

2) In situations where someone was drinking too much and college students did not intervene, what was the reason they did not intervene?
3) Are demographic characteristics and binge drinking associated with college students' reasons for not intervening when someone was drinking too much?

Methods

To address these research questions, a cross-sectional study was conducted using secondary data from the Healthy Minds Study, an annual web-based survey study examining mental health, service utilization, and related issues among undergraduate and graduate students (Healthy Minds Network, 2015). The survey also included questions about intervening in difficult situations.

Procedure. The Healthy Minds sample included 60 colleges that participated one or more times. For this study, the sample was restricted to 41 U.S. colleges that did not have school medical amnesty policies and were not located in states with medical amnesty laws at the time the survey was administered and to the spring 2012, 2013, and 2014 survey administrations. This sample includes 2 two-year public, 23 four-year public, and 14 four-year private schools, one system with 13 two-year public schools, and one system with 7 two-year and 19 four-year public schools. Schools ranged in size from approximately 560 undergraduate students to nearly 50,000 students. At schools with more than 4,000 students, a random sample of 4,000 students was recruited

from the full student population; on campuses with less than 4,000 students, all students were recruited.

All students invited to participate received an email containing a description of the study, information about confidentiality and potential risks and benefits associated with participating, survey instructions, and an online consent form. Up to three follow-up emails were sent. All students were informed that they were entered into a drawing to win cash prizes regardless of survey completion.

This study was approved by the institutional review boards at all campuses.

Measures. Questions related to intervening in an alcohol-related situation, binge drinking, and demographics were analyzed in this study. To assess *intervening in an alcohol-related situation*, students were asked if they intervened in a situation where someone was drinking too much in the past year. To assess *not intervening in an alcohol-related situation*, students were asked if they witnessed a situation where someone was drinking too much in the past year but did NOT intervene. To assess *reasons for not intervening in difficult situations*, students who had responded that they did not intervene when someone was drinking too much in the past year were asked the reason for not intervening. Response options included: I was afraid of embarrassing myself; I assumed someone else would do something; I didn't know what to do; I didn't feel confident; I felt it was none of my business; I was afraid my friends wouldn't support me; I felt it was unsafe; I was afraid I'd get in trouble. Students could also

indicate: “Other *(please specify)”*. Students were asked to check all that apply. These responses for why they did not intervene were recoded to create nine dichotomous variables: yes, no. The survey asked students if they witnessed multiple risky or difficult situations (e.g., someone was drinking too much; someone was at risk of being sexually assaulted; someone was using hurtful language (e.g., bullying, sexist, racist, or homophobic comments); someone was experiencing significant emotional distress or thoughts of suicide) but asked just one question about students’ reasons for not intervening in these situations.

To assess *binge drinking*, students were asked: During the last two weeks, how many times have you had four (for females) or five (for males) or more drinks in a row? Response options included: none; once; twice; 3 to 5 times; 6 to 9 times; 10 or more times. These response options were recoded to create a dichotomous variable: engaged in high-risk drinking (at least once in the last two weeks), did not engage in high-risk drinking.

Demographic questions asked students their:

- age (response options: 18; 19; 20; 21; 22; 23-25; 26-30; 31-35; 36-40; 41+). These response options were recoded to create a dichotomous variable: 18-20 years, 21-25 years.
- gender (response options: female; male; transgender). These response options were recoded to create a dichotomous variable: female, not female.

- race/ethnicity (response options: White or Caucasian; African American/Black; Hispanic/Latino; American Indian/Alaskan Native; Arab/Middle Eastern or Arab American; Asian/Asian-American; Pacific Islander; other, not applicable). The variables were recoded to create a variable with seven levels: white, American Indian/Alaska Native, Asian/Pacific Islander, Black/African American, Hispanic/Latino, Other, Multiracial.
- International student status (response options: yes; no)
- residence (response options: campus residence hall; fraternity or sorority house; other university housing; off-campus, non-university housing; parent or guardian's home; other). These response options were recoded to create a variable with four levels: residence hall, fraternity/sorority, parent or guardian's home, other.

Analysis. The descriptive statistics of the sample were examined, including the dependent variables: intervening when someone was drinking too much, not intervening when someone was drinking too much, and the nine reasons for not intervening when someone was drinking too much.

To answer research question 1, a series of generalized linear mixed models were used to assess the associations between demographic characteristics and binge drinking and the two outcomes of interest: intervening when someone was drinking too much and not intervening when someone was drinking too much. The sample for these analyses was restricted to students who

indicated they intervened in a situation where someone was drinking too much in the past year and/or they witnessed a situation where someone was drinking too much in the past year but did not intervene. Generalized linear mixed models allow appropriate analysis for data collected from individuals nested within groups by identifying groups and members as nested random effects and including regression adjustment for covariates measured at various levels in the design (Murray, 1998). Because the outcomes are categorical (yes vs. no) and not rare, generalized linear mixed models with the logit link and binomial distribution were fit to estimate predicted prevalence. School was included as a random effect to appropriately account for clustering of students within schools, age, gender, race/ethnicity, international student status, residence, and binge drinking status were included as fixed effect covariates. The multivariate model regressing the outcome of intervening when someone was drinking too much on all the demographic variables and binge drinking would not converge. Because race/ethnicity is not significantly associated with the outcome in the bivariate model and the multivariate model without race/ethnicity would converge, race/ethnicity was excluded from the final multivariate model for intervening when someone was drinking too much presented in Table 3.

To answer research question 2, the prevalence of the nine reasons for not intervening when someone was drinking too much was examined for two groups of students: 1) students who witnessed one or more situations in the past 12 months in which they could have intervened, including when someone was

drinking too much, and did not intervene and 2) students who only witnessed a situation in the past 12 months when someone was drinking too much and did not intervene. To answer research question 3, the prevalence of the nine reasons for not intervening when someone was drinking too much was examined by demographic characteristics and binge drinking. Chi-square tests were used to test the null hypothesis that no association exists between each reason for not intervening when someone was drinking too much and each demographic characteristic and binge drinking. The sample for these analyses was students who witnessed one or more situations in the past 12 months in which they could have intervened, including when someone was drinking too much, and did not intervene.

Results

Descriptive statistics. Sample descriptive statistics are presented in Table 2. Nearly one-half (49.8%) of students reported being in at least one situation in the past year when someone was drinking too much. Among these students, 74.2% intervened in at least one situation when someone was drinking too much and 53.8% did not intervene in at least one situation when someone was drinking too much. Notably, of the students who reported being in at least one situation in the past year when someone was drinking too much, 28% intervened in at least one situation but also did not intervene in at least one other situation.

Table 2. Sample descriptive statistics.

Variable	%
Age	
18-20 years old	48.2
21-25 years old	51.8
Gender	
Female	65.0
Male	35.0
Race/Ethnicity	
White/Caucasian	68.6
American Indian/Alaskan Native	0.2
Asian/Pacific Islander	13.7
African American/Black	3.7
Hispanic/Latino	5.0
Other	2.2
Multiracial	6.6
Residence	
Campus residence hall	35.1
Fraternity or sorority house	1.7
Parent or guardian's home	15.4
Other	47.9
International Student	
Yes	7.7
No	92.3
Binge drinking	
Yes	44.6
No	55.4
Was in a situation in the past year when someone was drinking too much	49.8

Intervening or not intervening when someone was drinking too much by demographic characteristics and binge drinking. The predicted prevalence of intervening when someone was drinking too much by demographic characteristics and binge drinking and predicted prevalence of not intervening when someone was drinking too much by demographic characteristics and binge drinking is presented in Table 3. Students who identified as underage, female, living in a fraternity or sorority house, and engaging in high-risk drinking had a significantly higher prevalence of intervening when someone was drinking too much than their peers. Students who identified as ages 21-25, male, American Indian/Alaska Native, and engaging in high-risk drinking had a significantly higher

prevalence of not intervening when someone was drinking too much than their peers.

Table 3. Predicted prevalence of intervening when someone was drinking too much by demographic characteristics and binge drinking and predicted prevalence of not intervening when someone was drinking too much by demographic characteristics and binge drinking.

	Intervening when someone was drinking too much		Not intervening when someone was drinking too much	
Variable	**Predicted Prevalence (%)**	**p-value**	**Predicted Prevalence (%)**	**p-value**
Age				
18-20 years old	74.4	0.0013	51.4	0.0176
21-25 years old	71.5		53.9	
Gender				
Female	74.8	<0.0001	49.1	<0.0001
Male	71.0		56.2	
Race/Ethnicity				
White/Caucasian			55.3	
American Indian/Alaskan Native			66.0	
Asian/Pacific Islander			49.9	
African American/Black		ns*	47.6	<0.0001
Hispanic/Latino			45.9	
Other			52.2	
Multiracial			50.9	
Residence				
Campus residence hall	73.9	0.0332	51.8	0.4129
Fraternity or sorority house	74.7		53.5	
Parent or guardian's home	72.1		51.8	
Other	71.0		53.5	
International Student				
Yes	71.7	0.1777	52.9	0.8385
No	74.1		52.4	
Binge drinking				
Yes	76.2	<0.0001	53.9	0.0061
No	69.4		51.4	

*Note: Race/Ethnicity is not significantly associated with intervening when someone was drinking too much. Because the multivariate model including age, gender, race-ethnicity, residence, international student status, and binge drinking would not converge, race/ethnicity was excluded from the final multivariate model.

Reasons for not intervening when someone was drinking too much.

Students' reasons for not intervening in situations when someone was drinking too much are presented in Table 4. The table presents reasons for not

intervening among two groups of students: 1) students who witnessed one or more situations in the past 12 months in which they could have intervened, including when someone was drinking too much, and did not intervene and 2) students who only witnessed a situation in the past 12 months when someone was drinking too much and did not intervene. A larger proportion of students selected each reason for not intervening among the group that witnessed one or more situations in which they could have intervened, including when someone was drinking too much, compared to the group that only witnessed a situation when someone was drinking too much but the pattern of reported reasons is the same for both groups. Among students who witnessed one or more situations in which they could have intervened, including when someone was drinking too much, and did not intervene and among students who only witnessed a situation in the past 12 months when someone was drinking too much and did not intervene, the most common reasons for not intervening were: “I felt it was none of my business” (64.3%, 61.7%) and “I didn’t know what to do” (37.5%, 26.3%). “I was afraid I’d get in trouble” was the least common reason for not intervening (5.1%, 3.0%).

Table 4. Reasons for not intervening when someone was drinking too much.

Reason	Witnessed one or more situations in which they could have intervened, including when someone was drinking too much, and did not intervene (%)	Only witnessed a situation when someone was drinking too much and did not intervene (%)
I felt it was none of my business.	64.3	61.7
I didn't know what to do.	37.5	26.3
I didn't feel confident.	24.8	15.2
I assumed someone else would do something.	20.0	15.6
I felt it was unsafe.	19.5	13.1
I was afraid of embarrassing myself.	10.6	5.4
I was afraid my friends wouldn't support me.	6.8	4.5
I was afraid I'd get in trouble.	5.1	3.0
Other	12.7	15.2

Reasons for not intervening when someone was drinking too much by demographic characteristics and binge drinking. The prevalence of students reporting the nine different reasons for not intervening when someone was drinking too much by demographic characteristics and binge drinking status are presented in Table 5. "I felt it was none of my business" and "I didn't know what to do" were the most common reasons for not intervening for all groups of students. "I was afraid I'd get in trouble" was the least common reason for not intervening for most groups of students. For students who identified as Asian/Pacific Islander, Hispanic/Latino, another race/ethnicity, living in parent or guardian's home, and international, "I was afraid my friends wouldn't support me" was the least common reason for not intervening while "I was afraid I'd get in trouble" was the next least common reason.

The proportion of students who reported the nine reasons for not intervening differed by demographic characteristics and binge drinking.

Significantly more underage students than students ages 21-25 reported six reasons for not intervening: “I was afraid of embarrassing myself”, “I assumed someone else would do something”, “I didn’t know what to do”, “I didn’t feel confident”, “I was afraid my friends wouldn’t support me”, and “I was afraid I’d get in trouble”. Significantly more males reported three reasons for not intervening: “I was afraid of embarrassing myself”, “I was afraid my friends wouldn’t support me”, and “Other”, while significantly more females reported three reasons for not intervening: “I didn’t know what to do”, “I didn’t feel confident”, and “I felt it was unsafe”. Four reasons for not intervening differed by race: “I didn’t feel confident”, “I felt it was none of my business”, “I was afraid I’d get in trouble”, and “Other”. Nearly all reasons for not intervening differed by residence. Compared to domestic student, significantly more international students reported they did not intervene because “I was afraid I’d get in trouble” and significantly fewer international students reported they did not intervene because “I assumed someone else would do something”, “I didn’t feel confident”, “I felt it was none of my business”, and “I was afraid my friends wouldn’t support me”. Significantly more students who reported engaging in binge drinking reported two reasons for not intervening: “I assumed someone else would do something” and “I felt it was none of my business”, while significantly more non-binge-drinkers reported four reasons for not intervening: “I was afraid of embarrassing myself”, “I didn’t feel confident”, “I felt it was unsafe”, and “I was afraid I’d get in trouble”.

Table 5. Reasons for not intervening when someone was drinking too much by demographic characteristics and binge drinking, Part 1.

	I felt it was none of my business.		I didn't know what to do.		I didn't feel confident.	
Variable	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**
Age						
18-20 years old	64.7	0.4333	39.6	0.0004	26.4	0.0017
21-25 years old	63.9		35.6		23.3	
Gender						
Female	64.0	0.5408	42.2	<.0001	26.7	<.0001
Male	64.7		29.9		21.7	
Race/Ethnicity						
White/Caucasian	65.8	<.0001	37.9	0.0806	26.0	0.0004
American Indian/Alaska Native	55.0		35.0		25.0	
Asian/Pacific Islander	54.4		40.6		22.5	
African American/Black	62.0		39.0		16.6	
Hispanic/Latino	62.4		31.6		18.3	
Other	59.8		29.1		15.8	
Multiracial	62.5		36.1		23.8	
Residence						
Campus residence hall	64.8	0.0108	39.4	0.0404	27.3	0.0001
Fraternity/sorority house	54.6		36.9		29.3	
Parent/guardian's home	61.7		38.4		21.0	
Other	64.8		36.0		23.5	
International Student						
Yes	48.0	<.0001	33.5	0.1285	15.4	<.0001
No	65.0		37.7		25.2	
Binge drinking						
Yes	66.1	<.0001	37.5	0.9835	23.7	0.0093
No	61.6		37.5		26.4	

Table 5. Reasons for not intervening when someone was drinking too much by demographic characteristics and binge drinking, Part 2.

	I assumed someone else would do something.		I felt it was unsafe.		I was afraid of embarrassing myself.	
Variable	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**
Age						
18-20 years old	21.5	0.0022	19.4	0.8139	12.1	<.0001
21-25 years old	18.7		19.6		9.2	
Gender						
Female	20.1	0.7903	21.8	<.0001	9.8	0.0032
Male	19.9		15.7		11.9	
Race/Ethnicity						
White/Caucasian	19.8		18.9		11.0	
American Indian/Alaska Native	15.0		10.0		15.0	
Asian/Pacific Islander	23.2		20.9		11.5	
African American/Black	21.9	0.2825	18.2	0.2203	5.4	0.1157
Hispanic/Latino	22.8		19.7		9.5	
Other	15.8		23.6		10.2	
Multiracial	19.8		22.8		8.4	
Residence						
Campus residence hall	21.7		19.8		12.6	
Fraternity/sorority house	29.3	0.0001	13.6	0.0005	15.2	<.0001
Parent/guardian's home	18.1		24.4		8.7	
Other	18.8		18.6		9.4	
International Student						
Yes	14.5	0.0101	21.2	0.4301	13.6	0.0706
No	20.3		19.4		10.5	
Binge drinking						
Yes	21.7	<.0001	18.0	0.0001	9.9	0.0207
No	17.5		21.6		11.6	

Table 5. Reasons for not intervening when someone was drinking too much by demographic characteristics and binge drinking, Part 3.

	I was afraid my friends wouldn't support me.		I was afraid I'd get in trouble.		Other	
Variable	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**
Age						
18-20 years old	7.4	0.0243	6.2	<.0001	11.5	0.0035
21-25 years old	6.1		4.1		13.7	
Gender						
Female	6.3	0.0353	5.2	0.3418	11.6	0.0004
Male	7.5		4.8		14.4	
Race/Ethnicity						
White/Caucasian	7.2		4.2		12.2	
American Indian/Alaska Native	10.0		10.0		25.0	
Asian/Pacific Islander	4.6		10.7		9.9	
African American/Black	5.4	0.1659	3.2	<.0001	10.7	<.0001
Hispanic/Latino	4.6		7.6		11.4	
Other	5.5		10.2		18.1	
Multiracial	6.9		5.7		19.6	
Residence						
Campus residence hall	7.6		5.6		11.8	
Fraternity/sorority house	10.1	0.0194	2.0	<.0001	12.1	0.1494
Parent/guardian's home	6.0		8.2		11.5	
Other	6.1		4.3		13.5	
International Student						
Yes	3.6	0.0206	16.3	<.0001	9.7	0.0960
No	6.9		4.6		12.8	
Binge drinking						
Yes	6.4	0.1040	4.1	<.0001	12.6	0.8525
No	7.3		6.5		12.7	

Discussion

For a student to call for help in an alcohol poisoning situation, they must decide to intervene in the situation. In the current study, nearly one-half (49.8%) of students reported being in at least one situation in the past year when someone was drinking too much. Among these students, 74.2% intervened in at least one situation when someone was drinking too much and 53.8% did not intervene in at least one situation when someone was drinking too much. While it is encouraging that the majority of students who were in a situation in the past year when someone was drinking too much did intervene at least one time, it is concerning that more than one-half of students who were in this situation did not intervene at least one time.

Among the students who reported being in at least one situation in the past year when someone was drinking too much, more than one-fourth (28%) intervened in at least one situation but also did not intervene in at least one other situation. This suggests that situational factors (e.g., location, relationship with the person who was drinking too much) may play an important role in students' decision to intervene. Further research is needed to understand how situational factors influence students' decision to intervene.

Students who identified as underage, female, and living in a fraternity or sorority house had a significantly higher prevalence of intervening when someone was drinking too much than their peers, while students who identified as ages 21-25, male, and American Indian/Alaska Native had a significantly

higher prevalence of not intervening when someone was drinking too much than their peers. These groups of students may have differentially received bystander intervention trainings that aim to encourage students to recognize and intervene in situations in which a peer might need help. Students who engaged in high-risk drinking had a significantly higher prevalence of both intervening and not intervening when someone was drinking too much compared to their peers. Important next steps might be for schools to identify why these groups of students responded the way that they did in situations when someone was drinking too much so that they can appropriately encourage all students to intervene in these situations. Focus groups might be an important tool for identifying the barriers that prevent students from intervening.

Like the decision to intervene, reasons for not intervening differed by demographic characteristics and binge drinking. Interventions to encourage students to intervene in situations when someone was drinking too much will likely be more successful if they acknowledge these differences and are tailored to meet the needs of each group. For example, compared to domestic students, international students were nearly four times more likely to report that they did not intervene because “I was afraid I’d get in trouble”. Similarly, students who identified as American Indian/Alaska Native, Asian/Pacific Islander, or another race/ethnicity were much more likely than their peers to report that they did not intervene because “I was afraid I’d get in trouble”. Often intervening in a situation when someone was drinking too much involves calling 911 and interacting with a

police officer or other authority. Societal structures create barriers that prevent marginalized groups from feeling safe seeking that help. Interventions should focus on fostering social justice rather than simply encouraging these students to seek help for their friends.

Among students who reported not intervening when someone was drinking too much, the most common reasons for not intervening were: “I felt it was none of my business” and “I didn’t know what to do”. “I was afraid I’d get in trouble” was the least common reason for not intervening. Medical amnesty policies, interventions increasingly being implemented to encourage college students to seek help for a peer by providing amnesty for college or state alcohol policy or law violations, are based on five assumptions: 1) students can correctly identify the warning symptoms of alcohol poisoning; 2) students can understand the risk associated with the symptoms of alcohol poisoning; 3) students responsible for help seeking are sober enough to judge the level of risk involved; 4) students are currently not calling for help due to fear of getting in trouble, either for themselves or their peers, and 5) students will be more likely to call for help if they are assured they will not get in trouble (Oster-Aaland et al, 2009). In this study, fear of getting in trouble was not a major barrier preventing students from intervening in alcohol-related situations. Rather, not feeling like the situation was their business or responsibility to help in and not knowing what to do were major barriers preventing students from intervening in alcohol-related situations. This finding suggests that implementing medical amnesty policies and laws might

not be sufficient to encourage students to intervene when someone has been drinking too much. Schools should consider interventions to empower students to take responsibility in situations when students drink too much and provide them with the skills to appropriately respond.

Limitations. This study using secondary data had several limitations. First, the schools included in the sample were not randomly selected to participate in the survey. Thus, our results might not be generalizable to all colleges and college students in the United States. Second, students were asked if they witnessed any of four risky or difficult situations (including someone was drinking too much) and then were asked just one question about their reasons for not intervening. If students witnessed more than one risky or difficult situation, it is not clear which reason(s) are associated with which situation(s). However, the sample of participants who reported not intervening when someone was drinking too much and not in other scenarios did not significantly differ from the entire sample of students who reported not intervening when someone was drinking too much. A previous study demonstrated that specific situational characteristics, including not knowing the other student well enough, feeling powerless, being intoxicated themselves, and wanting to avoid conflict, inhibit students' decision to intervene, including (Thomas & Seibold, 1995). Unfortunately, the current study did not ask students information about the situations when someone was drinking too much. For example, we do not know how serious the alcohol-related situations was (e.g., alcohol poisoning), how well the student knew the person

who was drinking too much, or the location of the situation. These situational characteristics definitely should be considered when developing interventions to encourage students to intervene in situations when someone was drinking too much. Despite these limitations, this study provides an important contribution to the limited research base related to why students do or do not intervene in alcohol-related situations.

Conclusion. Nearly one-half of students reported being in at least one situation in the past year when someone was drinking too much. The majority (74.2%) of students who were in this situation did intervene at least one time but more than one-half of students who were in this situation did not intervene at least one time. Preventing students from drinking too much in the first place is an important strategy for reducing negative consequences associated with alcohol use but understanding why students do or do not intervene in situations when someone was drinking too much and appropriately encouraging all students to intervene in these situations might also help reduce the harms associated with college student alcohol use.

Manuscript 2: Implementation of a State Medical Amnesty Law

Significance

Both states and colleges are increasingly enacting medical amnesty policies and laws as one strategy to reduce the risk of death resulting from alcohol poisoning and other negative consequences associated with underage and harmful drinking. As of May 2017, 35 states and Washington, D.C. have medical amnesty laws (The Medical Amnesty Initiative, 2016). The state of Minnesota enacted a medical amnesty law in May 2013, and the medical amnesty law went into effect on August 1, 2013. According to Minnesota's medical amnesty law,

a) A person is not subject to prosecution [for consuming or possessing alcohol under the age of 21 years]…if the person contacts a 911 operator to report that the person or another person is in need of medical assistance for an immediate health or safety concern, provided that the person who initiates contact is the first person to make such a report, provides a name and contact information, remains on the scene until assistance arrives, and cooperates with the authorities at the scene.
b) The person who receives medical assistance shall also be immune from prosecution.

c) Paragraph (a) also applies to one or two persons acting in concert with the person initiating contact provided that all the requirements of paragraph (a) are met.

Policy is one strategy to promote health but simply enacting a policy is often not sufficient to foster intended health behaviors and enactment alone does not guarantee that implementation will be consistent with a policy's objectives (Gerston, 2004). For policies to be effective, appropriate agencies must convert new laws and programs into practice (Gerston, 2004). As described by the Alcohol Epidemiology Program (AEP), the policy likely has to be fully and effectively implemented to achieve its intended goal (Jones-Webb et al, 2014). The AEP Alcohol Policy Implementation Model describes alcohol policymaking as a multistage process that begins with the identification and consideration of a problem. A policy (e.g., statute, ordinance, zoning code) to address the problem may be developed and adopted. Policy implementation then consists of building public awareness and educating stakeholders, monitoring and enforcing compliance, evaluating process and outcomes, and institutionalizing the policy. The ultimate goal of this process is a policy that achieves its intended objective and maintains its effectiveness over time (Jones-Webb et al, 2014).

Educating stakeholders and building public awareness of the policy is the important first step in policy implementation (Jones-Webb et al, 2014). The goal of this step is to increase compliance, facilitate enforcement, and generate public and political support for the policy. Policy awareness alone may be sufficient to

achieve compliance from a large proportion of the affected population, but full compliance might require enforcement (Jones-Webb et al, 2014; Wagenaar & Toomey, 2002). Evaluation of a new alcohol policy is necessary for determining if it is achieving its objectives, and evaluation results should be used to determine if policies should be modified to increase their efficacy (Jones-Webb et al, 2014). Finally, an alcohol policy needs to be institutionalized or sustained over time, which may include adapting the policy, publicizing policy successes, and educating new leaders about the policy (Jones Webb et al, 2014).

For implementation to occur, an entity with sufficient resources must be identified to carry out implementation tasks, the entity must be able to translate goals into an operational framework, and the entity must deliver on its assignment and be accountable for its actions (Gerston, 2004). Minnesota's medical amnesty law was enacted at the state level, provides immunity for all underage individuals (not just underage college students), and does not designate colleges to implement it. However, implementation of this law at the college level may be necessary to encourage students to seek help when they see symptoms of alcohol poisoning, as shown in Figure 1. For example, colleges may need to educate campus stakeholders, including students, staff, parents, campus security, local law enforcement, and community members, about the medical amnesty law. The Minnesota medical amnesty law requires that students calling for help provide a name and contact information, remain on the scene until assistance arrives, and cooperate with the authorities at the scene. Police and

student conduct offices could monitor student compliance with these requirements. Additionally, school officials could monitor police compliance with not prosecuting minors in these situations. Next, school officials might evaluate the medical amnesty policy by determining if it is meeting its goal of decreasing barriers to calling 911 in an alcohol poisoning situation. Finally, college officials could assess if the law has to be adapted at all to changing campus conditions and if new leaders, enforcement agents, and students need to be educated about the law. They could also communicate to campus stakeholders about successes created by the law. Medical amnesty-related practices and policies at the college level likely vary from college to college. While Minnesota's medical amnesty law aims to encourage individuals to seek help when they see symptoms of alcohol poisoning even if they are under age, these policy implementation activities conducted at the college level will potentially influence college students' decision to actually intervene in these alcohol poisoning situations.

The objective of the proposed study is to describe how colleges in Minnesota implemented the state medical amnesty law by addressing four research questions:

1) How and to what extent did colleges educate stakeholders and build public awareness about the medical amnesty law?
2) How and to what extent did colleges monitor and enforce compliance with the medical amnesty law?

3) How and to what extent did colleges evaluate the medical amnesty law?
4) How and to what extent did colleges institutionalize the medical amnesty law?

As colleges and states continue to enact medical amnesty policies and laws, Minnesota colleges' implementation activities might provide important insight for the success of these laws in encouraging students to intervene in alcohol poisoning situations on college campuses across the country.

Methods

To address these research questions, telephone interviews were conducted with key informants in three areas (e.g., alcohol use prevention/health, student affairs, and police/security) at 15 colleges in Minnesota. Participants were asked how the state medical amnesty law had been implemented on their campuses. Conducting descriptive quasi-deductive analysis of key informant interview data allowed identification of key themes related to how colleges in Minnesota implemented the state medical amnesty law.

Procedure. The college staff person most knowledgeable about medical amnesty law implementation in three areas (e.g., alcohol use prevention/health, student affairs, and police/security) at 16 Minnesota colleges was identified by searching institution websites and asking for referrals to the appropriate person on each campus. Up to four attempts to contact key informants were made.

Phone interviews were conducted using a question guide adapted from the question guide developed by the Alcohol Epidemiology Program; results from this study were used to develop the Alcohol Epidemiology Program Alcohol Policy Implementation Model (Jones-Webb et al, 2014).

The University of Minnesota's Institutional Review Board approved this study (study number: 1511E80704).

Participants. Institutions were selected for this study based on participation in the 2015 College Student Health Survey, a surveillance tool used to monitor the health of college students in a number of areas: health insurance, health care utilization, mental health, tobacco use, alcohol and other drug use, financial health, personal safety, nutrition, physical activity, and sexual health (Boynton Health, 2015). Seventeen schools participated in the 2015 College Student Health Survey but the principal investigator's institution was excluded from this study's sample to reduce potential bias. No key informants were interviewed at another institution, resulting in key informant interviews representing 15 institutions. The 15 schools included five public four-year schools, four private four-year schools, and six public two-year schools in Minnesota. Across the colleges, participation among key informants ranged from 31% among police/security key informants to 75% among alcohol prevention/health and student affairs key informants (see Table 6).

Table 6. Key informant participation.

Status	Alcohol Use Prevention/Health	Student Affairs	Police/ Security
Participated	12 (75%)	12 (75%)	5 (31.3%)
Declined/Referred to another contact	2 (12.5%)	0 (0%)	2 (12.5%)
Did not respond	0 (0%)	4 (25%)	9 (56.3%)
No one in role	2 (12.5%)	0 (0%)	0 (0%)

Question Guide. The original question guide asked community leaders about implementation of policies restricting malt alcohol beverages (Jones-Webb et al, 2014). These questions were adapted to ask about implementation of the medical amnesty law on campus. The question guide (see Table 7 for the full list of questions) contained questions to gather information about the four components of policy implementation: building public awareness and educating stakeholders, monitoring and enforcing compliance, evaluating process and outcomes, and institutionalizing the policy (Jones-Webb et al, 2014).

Table 7. Question guide, Part 1.

Implementation Components	Questions
High-Risk Drinking and Medical Amnesty Law on Campus	1. Tell me about a situation where a student called 911 in a medical emergency. 2. How would you characterize high-risk drinking on your campus? 3. How much is alcohol poisoning a concern on your campus? 4. Tell me about a student medical emergency on campus that was caused by alcohol use. What happened? 5. How has Minnesota's Medical Amnesty Law impacted your campus?
Awareness and Education	6. Who on or near your campus would you identify as key stakeholders for the Medical Amnesty Law? 7. What communication methods, if any, were used to educate stakeholders (in particular: students, staff, parents, campus security, local law enforcement, community members) when the law was first enacted about: a. The purpose of the law b. Who must comply with the law (e.g., students calling for help need to provide a name and contact information, remain on the scene until assistance arrives, and cooperate with the authorities at the scene; police should not prosecute minors in these situations) c. How to comply with the law d. Monitoring and enforcement methods 8. Which groups were instrumental in communicating with stakeholders about the law?
Monitoring and Enforcing Compliance	*According to Minnesota's Medical Amnesty Law,* ▪ *A person is not subject to prosecution if the person contacts a 911 operator to report that the person or another person is in need of medical assistance for an immediate health or safety concern, provided that the person who initiates contact is the first person to make such a report, provides a name and contact information, remains on the scene until assistance arrives, and cooperates with the authorities at the scene.* ▪ *The person who receives medical assistance and one or two persons acting in concert with the person initiating contact shall also be immune from prosecution.* 9. How would you describe students' compliance with the Medical Amnesty Law? ▪ Prompt: Do students calling for help provide a name and contact information, remain on the scene until assistance arrives, and cooperate with the authorities at the scene? 10. Is student compliance being monitored? If yes, how? 11. How would you describe law enforcement's compliance with the Medical Amnesty Law? ▪ Prompt: Do police comply with not prosecuting minors in these situations? 12. Is law enforcement compliance being monitored? If yes, how?

Table 7. Question guide, Part 2.

Evaluation	13. Do you know of any plans to assess the impact of the law with some sort of evaluation? 14. Are you seeing any impact from the law so far; do you think the law will accomplish what was intended? ▪ Prompt: Have there been any compliance or enforcement issues? ▪ Prompt: Are there changes that you'd like to see made?
Institutionalization	15. Since it was enacted, has the implementation process on campus been adapted at all to changing conditions? ▪ If yes, how? ▪ If yes, describe the conditions that inspired the change. 16. Have successes related to the law been publicized? ▪ If yes, how? 17. Have new leaders and enforcement agents been educated about the policy and the purpose of the law? ▪ If yes, how? *18.* How are new students educated about the policy and the purpose of the law?

Analysis. All phone interviews were audio-recorded, and a transcription service was used to transcribe all key informant interviews verbatim. The transcripts were uploaded to the qualitative software ATLAS.ti version 1.0.51. Themes related to the research question were identified within the interview text by developing descriptive codes (i.e., words or short phrases that symbolically assign a summative, salient, essence-capturing, and/or evocative attributes to a portion of data) (Saldana, 2016, p. 4). This occurred in several steps as recommended by Saldana: During first cycle coding, descriptive coding was used to summarize responses to each interview question, using codes generated by the principal investigator (2016). A codebook was formalized, defining each code, after four interviews had been coded. New, inductive codes identified after developing the codebook were added to the codebook and all interviews that had already been coded were reviewed to make sure that the idea was not already described by another code or missed. A second coder independently coded

approximately 40% of the interviews, coding discrepancies and decisions were discussed, and the codebook was updated to clarify and better define any unclear codes. Coding decisions and notes were documented in an electronic memo. During the second cycle coding, first cycle codes were organized into descriptive non-overlapping categories or themes (Saldana, 2016). Quotes were identified to represent the themes.

Results

Related to the four policy implementation components (e.g., awareness and education of stakeholders, monitoring and enforcement, evaluation, institutionalization), 19 themes were identified. Each theme is described below within its policy implementation component, with representative quotes provided from the participants.

Awareness and Education of Stakeholders

Themes related to awareness and education of stakeholders focused on identifying stakeholders, communication methods to educate stakeholders about the law, and groups instrumental in communicating with stakeholders:

Multiple stakeholders of medical amnesty law. Key informants identified multiple groups as stakeholders of the medical amnesty law. For example, one key stakeholder said, *"I would say it would be the entire campus community, but in particular, obviously, the students, administrators, the police department. But I would say that the entire campus community is a stakeholder."* Campus departments (e.g., alcohol prevention, health service, student affairs), students,

campus police, safety, or security, local law enforcement, and community partners were the most frequently mentioned stakeholders.

Communication activities for students and staff. When asked about communication methods used to educate stakeholders about the law, key informants generally identified communication activities for staff (e.g., work groups, trainings) and communication activities for students (e.g., new student orientation). Communication activities for staff varied from formal trainings to informal conversations. According to one key informant, *"I would not say it was really formally put out there to staff in any way, but came up in conversations and committee meetings or in department meetings and things like that".* According to another key informant, *"We have communicated with students consistently through student orientation, publications, all of our alcohol education courses."* Many respondents reported that no communication methods were used or that they did not know what communication methods were used.

Alcohol use prevention/health, police/security, student affairs, and housing instrumental in communicating about the law. The alcohol prevention/health promotion department, campus security/public safety, student affairs, and housing and residential life were most frequently described as being instrumental in communicating with stakeholders about the medical amnesty law. One key stakeholder from the alcohol prevention/health area shared, *"We partnered with the local police departments to get good information and be visible to the*

students to talk about it and share information, and if they had questions about it, that sort of thing."

Monitoring and Enforcement

Themes related to monitoring and enforcement focused on describing how students and law enforcement comply with the law and how compliance is monitored:

Students demonstrate positive behavior. When asked to describe students' compliance with the medical amnesty law, key informants generally described positive student behavior. Students cooperate, comply with the medical amnesty law, and have called for help for other students who needed it. According to one key informant, *"I would say that most of our students are pretty good with understanding the spirit of it. They know if somebody's in trouble, they need to stick around and be helpful and be supportive and they got it".* Some respondents did not know how students complied with the medical amnesty law.

Activities and departments monitor student compliance. Some key informants described using activities to monitor student compliance with the medical amnesty law and identified one or more campus departments that were responsible for monitoring student compliance (e.g., housing, student conduct office). Student compliance monitoring activities ranged from informal monitoring to systematic monitoring. One participant stated, "*We don't have formal mechanisms to be able to monitor it. However, we do monitor informally through our conversations with students, particularly in our alcohol education classes and*

in our conversations with them". However, more than half of the respondents reported that student compliance was not being monitored or that they did not know how student compliance was being monitored.

Law enforcement demonstrates positive behavior and sentiment. When asked to describe law enforcements' compliance with the medical amnesty law, the majority of key informants described positive law enforcement behavior. For example, one key informant said, *"Oh they're great. They really are just trying to keep our students safe, and I think they've worked really, really well to make sure that – just to encourage students to be helpful"*. Key informants also described positive law enforcement sentiment about the law. Law enforcement is generally aware of the law, supportive of the law, and trying to keep students safe. For example, *"my understanding is they are, all of them are very in support of the law, that their first concern is getting young adults help."* According to another key informant, *"I think that they're fully aware of it, and they do understand that it is the law, so I think it seems like they're aware of it and they are good to comply with the enforcement of it".*

Don't know how law enforcement compliance is monitored. The majority of key informants did not know how law enforcement was being monitored. For example, *"I would hope that public safety is also monitoring that as well, but I'm not entirely sure."*

Evaluation

Themes related to evaluation focused on plans to assess the impact of the medical amnesty law and describing the law's impact:

No plans to assess the medical amnesty law. Most key informants reported that either there were no plans or they didn't know whether there were plans to evaluate the medical amnesty law. One key informant reported, *"We don't really – well, I don't believe there's any plans. Yeah. I think if we saw it happening a lot, then that would be something we would look into. But like I said, we just haven't really had to deal with it much."*

Medical amnesty law will accomplish what was intended. Despite a lack of evaluation, many key respondents believe the medical amnesty law will 1) accomplish what it was intended to accomplish (e.g., encourage students to seek medical assistance in alcohol-related emergencies even if they are under age 21), 2) that it is accomplishing what was intended, or 3) that it will accomplish what was intended if there is greater awareness of the law. As one participant stated, *"I think once there is a greater awareness of the law, that it will accomplish what's intended."* According to another key informant, *"Absolutely. I definitely think it will accomplish what it was intended to accomplish."*

Key informants have varying opinions on the impact of the medical amnesty law they have seen so far:

Students demonstrate positive behavior. Some key informants report positive student behavior because of the medical amnesty law and examples of

students using the law. One key informant said, *"I think we're seeing people use it, and we're seeing people that are pretty intoxicated that are now being helped because their friends are calling, knowing that they're not going to get in trouble by calling".*

No impact due to medical amnesty law. Many key informants have not seen an impact due to the medical amnesty law. For example, *"I haven't seen anything that really shows that it's being very impactful."*

Problems might prevent impact. Key informants also described problems that might prevent the medical amnesty law from having an impact. They indicated that their campus is not fully aware of the medical amnesty law and students still hesitate to call 911 in medical amnesty situations. For example, *"I think that as much as you tell an 18 year old that they're not gonna get in trouble, they may not always believe that. And so, I think that students are still somewhat anxious about getting themselves in trouble, getting their friends in trouble, or both."* According to another key informant, *"Honestly, I think that maybe not all the students know about it or don't trust it."*

Institutionalization

Themes related to institutionalization focused on describing how new leaders and students have been educated about the law, successes have been publicized, and implementation plans have changed since the law was first enacted:

Communication activities for some new staff. Key informants generally reported that some new leaders are educated about the law through communication activities for staff (e.g., trainings, meetings, orientations). However, some new leaders receive no education about the medical amnesty law. One key informant described, *"Well, there is an orientation process for new staff and faculty. And there's a piece of information about that in our orientation packages,"* while another key informant explained, *"Well, I would say those of us as employees who are outside of working directly with students on behavior-related issues and other issues, I would say we probably haven't informed well at all."*

New students educated about the medical amnesty law at orientation. When asked how new students are educated about the law, the majority of key informants identified new student orientation as the primary communication activity targeted at students. For example, *"And all new students come to orientation. So, we hope to blanket them with that information right away when they come to campus."*

Medical amnesty law successes not publicized. Nearly all key informants said that no successes related to the law have been publicized. According to one key informant, *"Well, sadly, 'cause we haven't really tracked them, we have not yet been able to publicize them."*

No changes to implementation plan. Many key informants reported that their implementation plan has not changed. For example, *"Yeah, I think it was*

more that we made sure we complied – you know, provided information about it, made sure our intra-campus policy was commensurate to echo it, ensured our public safety officers were aware of it to provide guidance, but yeah, then that's kind – then we stopped."

Medical amnesty law prompted a school medical amnesty policy. Key informants most frequently reported that their implementation plan for the state law has been adapted on campus to create or begin conversations about creating a campus medical amnesty policy. According to one key informant, *"I would say for us, we modeled our policy after it, so it was a good thing."*

Better communication with students. Some key informants also reported their implementation plan has been adapted on campus by identifying a need or a plan to better communicate with students about medical amnesty. For example, *"We just continue to push really hard in our classes and doing tabling and education about it in the presentations that we go out and do."*

Lack of Awareness, Communication, and Information

Many key informants identified lack of awareness of, lack of communication about, or lack of information about the medical amnesty law across several questions. For example, *"I think part of it is, is that there needs to be more education, not only through our students, but to the community, and I see right now, probably, more training with law enforcement itself about [the] new statute and when they should be maybe allowing or giving information to students in regard to it before they look at handing out citations."*

Discussion

This study describes how Minnesota colleges implemented the state medical amnesty law. We found that although some colleges had done some implementation of the medical amnesty law, some colleges have done very little and all colleges could do more.

One important policy implementation component is building awareness and educating stakeholders (Jones-Webb et al, 2014). Key informants generally identified multiple different stakeholders of the medical amnesty law, including campus departments (e.g., alcohol prevention, health service, student affairs), students, campus police, safety, or security, local law enforcement, and community partners. This broad description of stakeholders is important and encouraging because stakeholders can help increase compliance, facilitate enforcement, and generate public and political support for a policy like the medical amnesty law. Communication methods used to educate stakeholders about the law generally consisted of communication activities for staff and communication activities for students. Communication activities for staff varied from formal trainings to informal conversations, and many respondents reported that no communication methods were used or that they did not know what communication methods were used. Additionally, lack of awareness of, lack of communication about, or lack of information about the medical amnesty law was identified across several policy implementation components. A more comprehensive communication plan that targeted multiple stakeholders

throughout the school year might have more effectively promoted compliance with and generate public and political support for the medical amnesty law.

Monitoring is another important component of implementation. Key informants generally perceived that both students and law enforcement generally comply with the medical amnesty law by demonstrating positive behavior and sentiment. However, it is not clear how compliance is being monitored. Since medical amnesty policies and laws are based on the assumption that students will be more likely to call for help in an alcohol-related situation if they are assured they will not get in trouble, systematic monitoring of both student and law enforcement compliance might insure that students behave appropriately in alcohol-related situations and do not get in trouble (e.g., receive a citation).

Evaluation is necessary for determining if a new alcohol policy is achieving its objectives (Jones-Webb et al, 2014). Unfortunately, most of the colleges do not have formal plans to evaluate the effects of the medical amnesty law on their campus. The limited research on medical amnesty policies and laws calls for additional research to determine the impact of current medical amnesty policies and laws on help-seeking behavior and alcohol use (Lewis & Marchell, 2006; Oster-Aaland et al, 2009; Oster-Aaland & Eighmy, 2007). Given the lack of research evidence, medical amnesty policies and laws are being implemented with little knowledge of their effectiveness (Oster-Aaland & Eighmy, 2007). While developing an evaluation plan prior to enacting and implementing the state medical amnesty law would have been the most effective strategy for determining

if the law is achieving its objectives, developing an evaluation plan now would still provide information to help assess the impact of the law and inform policy discussions in other states and campuses.

To maintain effectiveness over time, an alcohol policy needs to be institutionalized (Jones Webb et al, 2014). While some communication activities are in place for some new staff and students, an ongoing, comprehensive communication plan that targets all stakeholders throughout the school year would be a more effective strategy. Because little evaluation is occurring, it is not surprising that implementation plans have generally not changed since the law was first enacted. The most common change was that a campus medical amnesty policy was created or that conversations about a campus policy were started. While it might be helpful to have both state law and school policy communicate consistent messages about helping other students who need help, the effectiveness of these strategies is not clear.

In response to a number of questions about implementing the medical amnesty law, many key informants said they could do more related to the medical amnesty law. Based upon the Alcohol Epidemiology Program Alcohol Policy Implementation Model, identifying strategies for communicating with stakeholders, monitoring compliance, and evaluating the law would have strengthened the process of implementing the medical amnesty law on college campuses.

Limitations. The primary challenges of this study were recruitment of key informants and incomplete information about implementation. First, participation ranged from 31% among police/security key informants to 75% among alcohol prevention/health and student affairs key informants. More than one-half (56.3%) of police/security key informants did not respond to requests for participation. Participation in this study was lower than the cooperation rate of 84.3% achieved using similar methods interviewing community leaders (Jones-Webb et al, 2014). Second, Minnesota's medical amnesty law went into effect on August 1, 2013, approximately three years prior to data collection. Some key informants had difficulty recalling implementation activities, and some key informants were not in their current position when the law went into effect. Third, many key informants did not have knowledge of activities occurring at the community or state level, such as student compliance and law enforcement compliance with the medical amnesty law off campus. Fourth, key informants potentially provided inaccurate information while attempting to provide socially desirable responses. However, this is unlikely as many key informants responded to questions about implementation activities by saying that they did not know the answer or that their school did not participate in any relevant activities. Fifth, some key informants' responses demonstrated lack of distinction or confusion between the state medical amnesty law and their school's medical amnesty policy so their responses might more accurately describe implementation of their school's policy than the state law. Finally, this information only reflects implementation activities

related to enactment of a state medical amnesty law in Minnesota. College campuses in other states might have different experiences.

Conclusion. A state medical amnesty law generally provides immunity for all underage individuals (not just underage college students) but implementation of this law at the college level may be necessary to encourage students to seek help when they see symptoms of alcohol poisoning. Although it is perceived that college students and law enforcement generally comply with medical amnesty, increasing communication with stakeholders, monitoring compliance, and evaluating the law would improve the implementation plan for the medical amnesty law on college campuses.

Manuscript 3: College Student Helping Behavior Before and After Enactment of a Medical Amnesty Law

Significance

Proponents of medical amnesty policies and laws assume that students will be more likely to call for help if they are assured they will not get in trouble. Thus, medical amnesty policies and laws aim to encourage college students to seek help when they see symptoms of alcohol poisoning by providing amnesty for university alcohol policy violations if a student calls for help in an alcohol-related medical emergency (Oster-Aaland et al, 2009) (see Figure 1).

Colleges and states are increasingly implementing medical amnesty policies and laws. The limited research on medical amnesty policies and laws calls for additional research to determine the impact of current medical amnesty policies and laws on help-seeking behavior and alcohol use (Lewis & Marchell, 2006; Oster-Aaland et al, 2009; Oster-Aaland & Eighmy, 2007). Just one peer-reviewed evaluation of a medical amnesty policy on a college campus is available. The number of calls for assistance to emergency medical services increased and slightly more students reported calling for help on behalf of an intoxicated person after policy implementation (Lewis & Marchell, 2006). However, this case study of one school's policy did not use a comparison group (Lewis & Marchell, 2006), limiting both generalizability and the ability to draw inference.

Researchers call upon administrators considering implementing medical amnesty policies to be diligent in gathering and analyzing pre-policy and post-

policy data indicating the frequency of help-seeking behavior to see if the help-seeking behavior increases post policy (Oster-Aaland et al, 2009). Additionally, colleges could examine the overall drinking rates prior to and following a medical amnesty policy. Researchers also encourage institutions to publish the results in peer-reviewed journals (Oster-Aaland & Eighmy, 2007). Given the lack of research evidence, administrators are implementing medical amnesty policies with little knowledge of their effectiveness (Oster-Aaland & Eighmy, 2007). To date, no assessment of the effect of a state medical amnesty law on college student behavior has been conducted.

The literature related to medical amnesty policies and laws is limited but potential pros and cons of medical amnesty policies and laws have been suggested. According to one college health professional, medical amnesty policies aim to promote the civility and citizenship of students by encouraging them to intervene in alcohol poisoning situations. This is consistent with colleges' mission to promote the total well being of its students by reducing the risks associated with alcohol use, and do not supersede existing college policies related to student conduct and alcohol use (Chapman, 2009). However, medical amnesty policies are in conflict with existing policies and state laws (e.g. minimum legal drinking age) and can potentially interfere with police and security staff's options regarding how best to handle individual situations (Chapman, 2009). Another important criticism of implementing medical amnesty policies on college campuses is their potential to enable underage drinking. Medical amnesty

policies can be viewed as a harm reduction strategy as they do not aim to change the students drinking behavior but rather aim to provide students with a way to seek help without consequence, reducing the potential for physical harm or death (Oster-Land & Eighmy, 2007). However, failing to address students' drinking behavior enables them to continue to engage in risky behavior without consequence. For example, students may drink more excessively knowing that they will not get in trouble should a negative consequence occur. Those that subscribe to the enabling perspective propose that medical amnesty policies are treating the symptom of the problem rather than the cause, and may in effect be exacerbating excessive drinking, the cause of the problem (Oster-Land & Eighmy, 2007).

The objective of the proposed study is to assess college student helping behavior in a drug- or alcohol-related situation before and after enactment of Minnesota's medical amnesty law by addressing three research questions:

1) Are college students more likely to call 911 in a drug- or alcohol-related situation after enactment of a state medical amnesty law?
2) Are school characteristics and individual characteristics associated with college students' likelihood of calling 911?
3) Are underage college students more likely to engage in high-risk drinking after enactment of a state medical amnesty law?

Methods

To address these research questions, I analyzed multiple years of data from the College Student Health Survey. This is a surveillance tool used to monitor the health of college students in a number of areas: health insurance, health care utilization, mental health, tobacco use, alcohol and other drug use, financial health, personal safety, nutrition, physical activity, and sexual health (Boynton Health, 2015).

Procedure. Students at 17 colleges located in Minnesota were recruited to participate in the College Student Health Survey one or more years (range: 1-6 years) prior to Minnesota's enactment of a medical amnesty law on August 1, 2013 and again in spring 2015 (see Table 9). Data from all 65 administrations of the survey between 2007 and 2015 across the 17 schools were included in the data set (see Table 8).

Table 8. Years of College Student Health Survey participation

School	Pre-Medical Amnesty Law Enactment							Post-Medical Amnesty Law Enactment
	2007	2008	2009	2010	2011	2012	2013	2015
1					X			X
2				O	O		O	O
3	O	O			X		X	X
4		O	X	X	X	X	X	X
5		O				X		X
6							O	X
7	O			O			O	O
8	O			X			X	X
9	O			O			O	O
10		O		O		O		X
11		O		O		O		O
12	O	O			O		O	O
13			O		O		O	O
14			O		O			O
15							O	O
16		O		O		O		O
17		O		O		O		O

Note: O=no school medical amnesty policy in place; X=school medical amnesty policy in place.

Colleges. The seventeen schools included six public four-year schools, four private four-year schools, and seven public two-year schools in Minnesota that chose to participate in the College Student Health Survey.

Survey Procedures. Based on enrollment at each individual school, either all students or a random sample of students 18 years of age or older were invited to complete the survey. The number of students at each school invited to complete the survey ranged from 306 (100% of student population) to 6000 (13.7% of the student population).

In February and March of the survey year, students selected to participate received a minimum of one and a maximum of 10 invitations to complete the survey, including postcards and emails, with a link to the online survey. Students

who chose to participate in the survey by following the survey link were directed to a survey consent page containing information about the survey's purpose and stressing that participation was anonymous and voluntary. They had the option either to continue in the survey process by checking the "I consent to participate" box or to opt out of the survey.

Table 9 provides a summary of the number of schools included in the survey each year, the incentives for students to complete the survey, the number of schools included in this analysis, and the response rate range across schools for each year. The incentives varied by year based upon the funding available (e.g., grant funding, state funding) and input from students (e.g., iPod touches™, iPad minis™, Amazon gift cards).

Table 9. Summary of survey logistics by year.

Year	Schools Surveyed	Incentives	Schools in Analysis	Response Rates of Schools in Analysis (%)
2007	14	▪ $5 gift card (all students) ▪ Gift cards valued at $3,000 (1), $1,000 (1), and $500 (2)	5	30.4-50.1
2008	14	▪ Gift cards valued at $3,000 (1), $1,000 (1), and $500 (2) at a variety of stores	8	24.5-43.5
2009	10	▪ Gift cards valued at $3,000 (1), $1,000 (1), and $500 (2) at a variety of stores ▪ iPod touches™ (6)	3	30.4-35.1
2010	17	▪ Gift cards valued at $3,000 (1), $1,000 (2), and $500 (1) at a variety of stores ▪ iPod touches™ (11)	9	26.6-64.8
2011	17	▪ Gift cards valued at $3,000 (1), $1,000 (1), and $500 (1) at a variety of stores ▪ iPads™ (5 + one per school)	7	28.5-58.2
2012	10	▪ Gift cards valued at $1,000 (2) and $500 (1) at a variety of stores ▪ iPod Touches™ (8) ▪ $100 Amazon gift cards (one per school)	6	15.9-48.4
2013	29	▪ Gift cards valued at $1,000 (1), $500 (1), and $250 (1) at a variety of stores ▪ iPad minis™ (6) ▪ $100 Amazon gift cards (one per school)	10	19.7-46.1
2015	17	▪ Amazon gift cards valued at $1,000 (1), $500 (1), and $250 (1) ▪ $100 Amazon gift cards (one per school)	17	15.0-55.8

The University of Minnesota Institutional Review Board (IRB) approved this study, IRB 0712E22463.

Measures. The College Student Health Survey contains a variety of health and health behavior questions. Questions related to likelihood of calling 911, high-risk drinking, and demographics were used in the analyses in the current study.

To assess *likelihood of calling 911*, students were asked the following question: If a person has "passed out" from alcohol/drug use and you cannot wake them up, how likely is it you would call "911"? Response options included:

very likely; somewhat likely; somewhat unlikely; and very unlikely. If a student cannot wake a person up for any reason, calling 911 is the appropriate response. All students responding that they are very likely to call 911 in this situation is the ideal outcome. Thus, these responses were recoded to create a dichotomous variable: very likely, not very likely.

To assess *high-risk drinking*, students were asked the following question: Think back over the last two weeks. How many times have you had five or more drinks in a sitting? (Response options: I do not drink alcohol; none; once, twice, 3-5 times, 6-9 times, 10 or more times). These response options were recoded to create a dichotomous variable: engaged in high-risk drinking, did not engage in high-risk drinking.

Demographic questions asked students their:

- Sex (response options: male; female; transmale/transman; transfemale/transwoman; genderqueer; something else; prefer to not answer). These response options were recoded to create a dichotomous variable: female, not female.
- Age (response options: 0-99). These response options were recoded to create a dichotomous variable: 18-20 years, 21-24 years.
- Ethnicity (response options: Hispanic or Latino; Hmong; Somali; none of the above; prefer not to answer) and racial identity (response options: American Indian or Alaskan Native; Asian; Black

or African American; Native Hawaiian or Other Pacific Islander; White (includes Middle Eastern); prefer not to answer; something else). The variables were recoded to create a variable with seven levels: white, American Indian/Alaska Native, Asian/Pacific Islander, Black/African American, Hispanic/Latino, Other, Multiracial.

- International student status (response options: yes; no)
- Living arrangements (response options: parent's home; rent or share rent; residence hall; fraternity/sorority; public/subsidized housing; own a house; homeless; other). These response options were recoded to create a variable with four levels: residence hall, fraternity/sorority, parent's home, other.

Two school-level variables and the state medical amnesty law variable were created: school type (two year; four year), school medical amnesty policy (yes; no), and state medical amnesty law (yes; no). Seven colleges enacted medical amnesty policies (see Table 9).

Analysis. The descriptive statistics of the sample were examined by survey year, and the prevalence of being very likely to call 911 in an alcohol-or drug-related situation was calculated by year and age group. To answer research questions 1 and 2, a generalized linear mixed model was used to assess the association between the state medical amnesty law, school characteristics, and individual characteristics and the outcome of interest: likelihood of calling 911.

Finally, to answer research question 3, the prevalence of high-risk drinking was calculated by year and age group and a generalized linear mixed model was used to assess the association between the state medical amnesty law, school characteristics, and individual characteristics and the outcome of interest: high-risk drinking among underage students.

Generalized linear mixed models allow appropriate analysis for data collected from individuals nested within groups by identifying groups and members as nested random effects and including regression adjustment for covariates measured at various levels in the design (Murray, 1998). Because the outcomes are categorical (very likely vs. not very likely; engaged in high-risk drinking vs. did not engage in high-risk drinking) and not rare, generalized linear mixed models with the logit link and binomial distribution were fit to estimate predicted prevalence. School was included as a random effect to appropriately account for clustering of students within schools and time (continuous), medical amnesty law (yes or no), school type (two-year or four-year school), school medical amnesty policy (yes or no), age (research question 3 only), gender, race/ethnicity, international student status, and high-risk drinking (research question 3 only) were included as fixed effect covariates.

Results

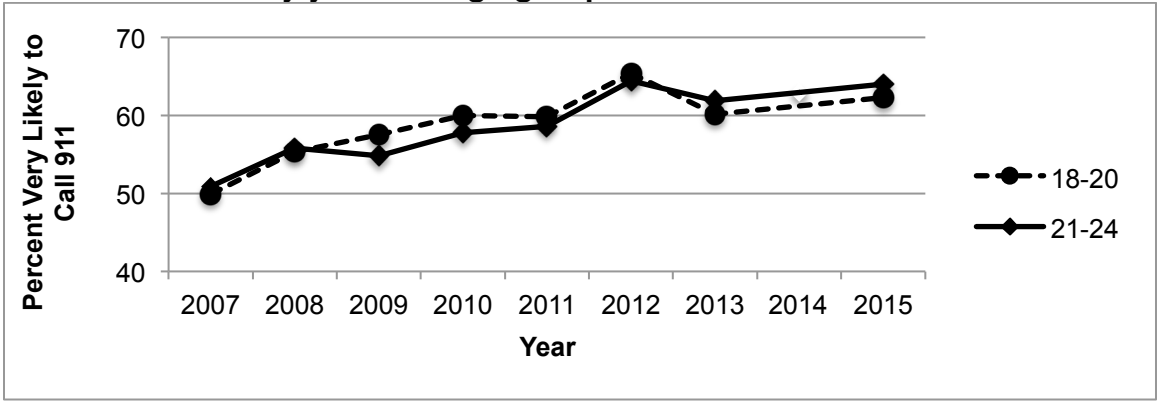
Sample descriptive statistics and alcohol use by year are presented in Table 10.

Table 10. Sample descriptive statistics by survey year.

	n or %							
	Pre-Medical Amnesty Law Enactment							Post-Medical Amnesty Law Enactment
	2007	2008	2009	2010	2011	2012	2013	2015
Students (n)	5504	4785	2975	8872	7167	4832	6637	11,383
Schools (n)	5	8	4	9	7	6	10	17
Age (%)								
18-20 years	47.5	48.7	49.5	50.6	48.9	50.4	50.6	54.5
21-24 years	52.5	51.3	50.5	49.4	51.1	49.6	49.4	45.5
Female (%)								
Yes	58.6	71.2	61.6	60.5	62.1	74.5	62.5	67.5
No	41.4	28.8	38.4	38.5	37.9	25.5	37.5	32.5
Race/Ethnicity (%)								
White	85.8	87.8	76.1	82.1	77.8	80.8	79.9	78.3
American Indian/Alaska Native	1.5	0.3	0.8	0.4	1.0	0.5	0.9	0.5
Asian/Pacific Islander	0.4	4.7	7.2	8.6	5.4	7.9	8.5	8.5
Black/African American	7.3	2.9	6.8	2.3	6.4	3.9	3.1	4.5
Hispanic/Latino	1.6	1.7	3.0	1.9	2.6	2.3	1.9	0.9
Other	1.3	0.7	2.1	1.7	2.1	1.6	1.5	0.5
Multiracial	2.1	2.1	4.1	3.1	4.8	3.1	4.4	6.8
International Student (%)								
Yes	4.7	3.7	5.9	6.2	3.7	2.4	6.4	4.9
No	95.3	96.4	94.1	93.8	96.3	97.6	93.6	95.1
Residence (%)								
Residence hall	22.0	15.4	8.4	23.4	19.3	12.8	25.0	25.7
Fraternity/Sorority	1.2	0.3	0.2	0.8	0.2	0.1	0.7	0.5
Parent's home	10.2	16.1	24.2	14.4	18.6	21.4	11.9	15.4
Other	66.6	68.2	67.2	61.4	61.9	65.7	62.4	58.4
High-Risk Drinking (%)								
Yes	42.1	35.0	36.4	36.6	31.4	25.9	32.0	24.4
No	57.9	65.0	63.6	63.4	68.6	74.2	68.0	75.6

Likelihood of calling 911 over time and after enactment of a state medical amnesty law. Prevalence of being very likely to call 911 in an alcohol-or drug-related situation by year and age group is shown in Figure 2. The prevalence of being very likely to call 911 in an alcohol- or drug-related situation significantly increased between 2007 and 2015.

Figure 2. Prevalence of being very likely to call 911 in an alcohol-or drug-related situation by year and age group.



The predicted prevalence of being very likely to call 911 in an alcohol- or drug-related situation before and after enactment of a state medical amnesty law is presented in Table 11. In the context of the secular trend of the prevalence of students being very likely to call 911 in an alcohol- or drug-related situation increasing over time, enactment of a state medical amnesty law was associated with lower prevalence of this behavior (0.568 vs. 0.599, p=0.0089).

Table 11. Predicted prevalence of being very likely to call 911 in an alcohol- or drug-related situation before and after enactment of a state medical amnesty law adjusted for all variables.

Variable	Predicted Prevalence (%)	p-value
State Medical Amnesty Law		
Yes	56.8	0.0089
No	59.9	

Likelihood of calling 911 by school characteristics and individual characteristics. The predicted prevalence of being very likely to call 911 in an alcohol- or drug-related situation by school characteristics and individual characteristics is presented in Table 12.

Having a school medical amnesty policy was not significantly associated with prevalence of being very likely to call 911 (0.593 vs. 0.574, p=0.0855).

School type was also not significantly associated with prevalence of being very likely to call 911.

Students ages 18-20 had a significantly lower prevalence of being very likely to call 911 than students ages 21-24 (0.561 vs. 0.606, $p<0.0001$).

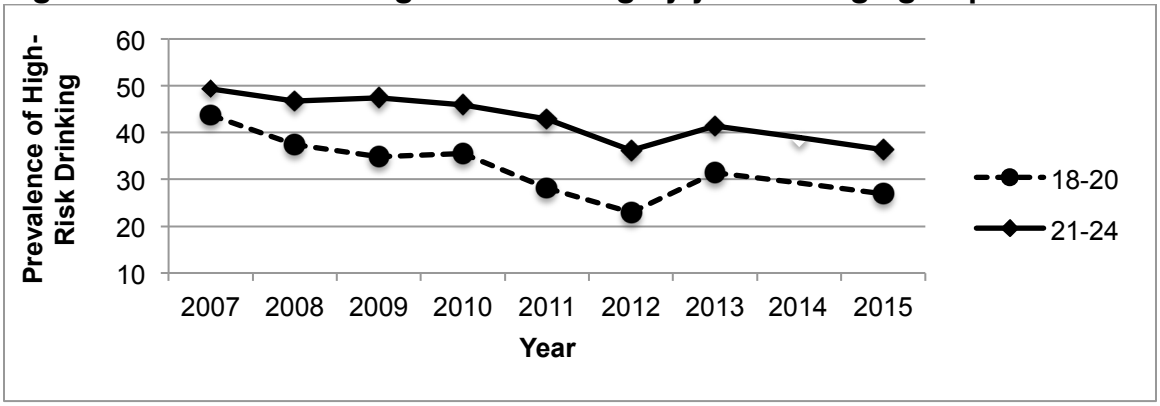
Students who identified as not using alcohol in the past year, not engaging in high-risk drinking, female, not international, Black/African American, and living in a fraternity or a sorority had a significantly higher prevalence of being very likely to call 911 in an alcohol- or drug-related situation than their peers.

Table 12. Predicted prevalence of being very likely to call 911 in an alcohol- or drug-related situation by school characteristics and individual characteristics adjusted for all variables.

Variable	Predicted Prevalence (%)	p-value
School Medical Amnesty Policy		
Yes	59.3	0.0855
No	57.4	
School Type		
Four-Year School	56.8	0.1045
Two-Year School	59.9	
Age		
18-20 Years	56.1	<0.0001
21-24 Years	60.6	
Engaged in High-Risk Drinking		
Yes	51.5	<0.0001
No	64.9	
Female		
Yes	64.1	<0.0001
No	52.4	
International Student		
Yes	55.3	<0.0001
No	61.3	
Race/Ethnicity		
White	59.0	<0.0001
American Indian/Alaska Native	60.9	
Asian/Pacific Islander	47.9	
Black/African American	62.8	
Hispanic/Latino	59.8	
Other	60.6	
Multiracial	56.9	
Residence		
Residence Hall	58.5	<0.0001
Fraternity/Sorority	63.5	
Parent's Home	54.8	
Other	56.2	

High-risk drinking over time and after enactment of a state medical amnesty law. Prevalence of high-risk drinking by year and age group is shown in Figure 3. The prevalence of high-risk drinking significantly decreased between 2007 and 2015.

Figure 3. Prevalence of high-risk drinking by year and age group.



The predicted prevalence of high-risk drinking by state medical amnesty law and school medical amnesty policy adjusted for all variables is presented in Table 13. In the context of the secular trend of the prevalence of high-risk drinking decreasing over time, enactment of a state medical amnesty law was associated with higher predicted prevalence of high-risk drinking among underage students (0.275 vs. 0.243, p=0.0211) and having a school medical amnesty policy was associated with lower predicted prevalence of high-risk drinking among underage students (0.242 vs. 0.276, p=0.0162).

Table 13. Predicted prevalence of high-risk drinking among underage students by state medical amnesty law and school medical amnesty policy adjusted for all variables.

Variable	Predicted Prevalence	p-value
State Medical Amnesty Law		
Yes	27.5	0.0211
No	24.3	
School Medical Amnesty Policy		
Yes	24.2	0.0162
No	27.6	

Discussion

College and states are increasingly implementing medical amnesty policies and laws as a strategy to reduce the risk of death resulting from alcohol poisoning. In the current study, the prevalence of being very likely to call 911 in an alcohol- or drug-related situation significantly increased between 2007 and 2015 but in the context of the secular trend, enactment of a state medical amnesty law was associated with lower prevalence of being very likely to call 911 in an alcohol- or drug-related situation. Additionally, having a school medical amnesty policy was not significantly associated with prevalence of being very likely to call 911. Thus, students in this study were not more likely to call 911 in a drug- or alcohol-related situation after enactment of a state medical amnesty law or a school medical amnesty policy. The NIAAA's College Alcohol Intervention Matrix (CollegeAIM) does not identify establishing amnesty policies as an effective environmental-level strategy to reduce underage and excessive drinking and associated consequences because of too few robust studies to rate effectiveness or mixed results. The current study supports this decision to not recommend establishing amnesty policies as an effective strategy.

If a person has "passed out" from alcohol or drug use and cannot be woken up, getting them help as quickly as possible is important. In many situations, one or more other students will have to decide whether or not they will call 911 to get the student help. In the current study, students who identified as not using alcohol in the past year, not engaging in high-risk drinking, being 21-24

years of age, female, not international, Black/African American, and living in a fraternity or a sorority all had a significantly higher prevalence of being very likely to call 911 in an alcohol- or drug-related situation than their peers. While the majority of students in these categories reported being very likely to call 911, many students in these categories did not report being very likely to call 911. Thus, there is much room for improvement. Schools can potentially capitalize on this information by encouraging these students who are very likely to call 911 to appropriately intervene in these situations and determining why other students are less likely to call 911 in these situations.

The current study was not able to assess how the schools implemented the medical amnesty law or policies or student awareness of the medical amnesty law or policies. Proponents of medical amnesty policies and laws assume that students will be more likely to call for help if they are assured they will not get in trouble. However, if students are unaware of the policy or that they will not get in trouble, the policy may not encourage them to call for help. More research is needed to understand how schools implement medical amnesty policies and laws, how schools communicate with key stakeholders (including students) about medical amnesty, and student awareness of medical amnesty laws and policies.

Medical amnesty policies aim to encourage college students to seek help when they see symptoms of alcohol poisoning by providing amnesty for university alcohol policy violations if a student calls for help in an alcohol-related

medical emergency (Oster-Aaland et al, 2009). These policies are based on the assumptions that students can correctly identify the warning symptoms of alcohol poisoning and that students can understand the risk associated with the symptoms of alcohol poisoning (Oster-Aaland et al, 2009). Colleges may or may not have increased education about alcohol poisoning and training on how to respond to alcohol poisoning when the state medical amnesty law went into effect. Because the survey did not include any questions on this topic, this study could not determine how medical amnesty law implementation activities at the college level might influence behavior above and beyond the effect of enactment of the law. More research is needed to assess how well students identify the symptoms of alcohol poisoning and understand the risk associated with alcohol poisoning.

Critics of medical amnesty policies and laws highlight their potential to enable underage drinking. In the current study, the predicted prevalence of high-risk drinking among underage students was higher after enactment of a state medical amnesty law, while the predicted prevalence of high-risk drinking among underage students was lower after enactment of a school medical amnesty policy. This finding highlights the need for additional research to determine the impact of current medical amnesty policies and laws on help-seeking behavior and on high-risk drinking among underage students.

Limitations. This study using secondary data had several limitations. First, the schools included in the sample were not randomly selected to participate in

the survey and were from a single state. Thus, these results might not be generalizable to all college and university students in the United States. Second, the study includes just one post-policy survey conducted approximately 18 months after enactment of Minnesota's medical amnesty law. This one survey and the 18-month follow-up interval may not be adequate to see a change in likelihood of calling 911. Different follow up intervals might be more appropriate based upon communication about the law and the transient nature of students within colleges. For example, if schools communicated about the law only when it was first enacted in 2013, new students in 2014 might not be aware of the law and returning students may or may not remember the communication from the previous year. Third, the survey question that assesses likelihood of calling 911 does not include information about the situation, such as how well the student knows the person that they cannot wake up or the location of the situation. A previous study has demonstrated that situational factors, such as not knowing the other student well enough and being intoxicated themselves, influence behavior (Thomas & Seibold, 1995). Additionally, students identifying that they are very likely to call 911 on a survey does not necessarily mean that they will actually call 911 if they are in a similar situation. Fourth, different schools and a different number of schools participated in the survey each year. Planning out an evaluation prior to enacting and implementing the state medical amnesty law would have allowed a more appropriate study design to assess the effects of the

law. Despite these limitations, this study provides an important contribution to the limited medical amnesty research literature.

Conclusion. The prevalence of being very likely to call 911 in an alcohol- or drug-related situation significantly increased between 2007 and 2015 but in the context of the secular trend, neither a state medical amnesty law or school medical amnesty policies were associated with an increase in the prevalence of this behavior. More research is needed to more fully evaluate how colleges implement medical amnesty policies and laws (including communication with stakeholders about medical amnesty), how medical amnesty policies and laws might interact with other efforts to reduce the negative consequences of alcohol use on college campuses, potential negative consequences of medical amnesty policies and laws, student awareness of medical amnesty policies and laws, student understanding of alcohol poisoning, and why students do call 911 in high-risk situations. Even with this additional research, colleges and universities may be better off utilizing CollegeAIM to identify and implement strategies most likely to reduce underage and harmful drinking and associated negative consequences (NIAAA, 2015).

Summary

College student alcohol use and associated negative consequences represent an important public health problem. Despite limited research, medical amnesty policies and laws are increasingly being implemented to reduce the risk of alcohol poisoning death. This dissertation serves as an important contribution to the very limited research on medical amnesty policies and laws by providing important insight into whether medical amnesty policies and laws should be a recommended strategy for reducing the negative consequences of college student alcohol use.

In manuscript 1, college students' decision to intervene in alcohol-related situations was assessed. Among students who reported being in at least one situation in the past year when someone was drinking too much, the majority intervened in at least one situation but more than one-half did not intervene in at least one situation. Among students who reported not intervening when someone was drinking too much, the most common reasons for not intervening were: "I felt it was none of my business" and "I didn't know what to do". "I was afraid I'd get in trouble" was the least common reason for not intervening. Interventions that provide amnesty for college or state alcohol policy or law violations and thus prevent students from "getting in trouble" might not be sufficient to encourage students to intervene when someone has been drinking too much.

In manuscript 2, how colleges in Minnesota implemented the state medical amnesty law was described. Some colleges in the study had done some

implementation of the medical amnesty law, but some colleges have done very little and all colleges could do more. Although college students and law enforcement were perceived to generally comply with medical amnesty, increasing communication with stakeholders (e.g., students, staff, faculty, parents, community members), monitoring compliance, and evaluating the law would improve implementation of the medical amnesty law on college campuses.

In manuscript 3, college student helping behavior before and after enactment of a state medical amnesty law was assessed. The prevalence of being very likely to call 911 in an alcohol- or drug-related situation significantly increased between 2007 and 2015 but in the context of the secular trend, enactment of a state medical amnesty law was associated with lower prevalence of being very likely to call 911 in an alcohol- or drug-related situation. Additionally, having a school medical amnesty policy was not significantly associated with prevalence of being very likely to call 911. Thus, students were not more likely to call 911 in a drug- or alcohol-related situation after enactment of a state medical amnesty law or a school medical amnesty policy.

This dissertation provides important information about medical amnesty policies and laws but more research is needed to more fully evaluate how colleges implement medical amnesty policies and laws (including communication with stakeholders about medical amnesty), how medical amnesty policies and laws might interact with other efforts to reduce the negative consequences of alcohol use on college campuses, potential negative consequences of medical

amnesty policies and laws, student awareness of medical amnesty policies and laws, student understanding of alcohol poisoning, and why students do call 911 in high-risk situations.

Many effective strategies have been identified to help colleges and universities reduce underage and harmful drinking and associated negative consequences, and it is best for colleges and universities to focus on interventions that have proven effectiveness for reducing alcohol-related problems (NIAAA, 2015). If states, colleges, and universities decide to implement medical amnesty, evaluation needs to be part of the implementation plan so the effectiveness of the strategy can be more fully understood.

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